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Xiaochun Nie

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EXAMINER

WERNER, DAVID N

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/716,316	<b>Applicant(s)</b> NIE ET AL.	
	<b>Examiner</b> David N. Werner	<b>Art Unit</b> 2621	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 May 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This Office action is issued as a result of the decision of the Pre-Brief Appeal Conference of 14 July 2008 to re-open prosecution following Applicant's Notice of Appeal of 12 May 2008. Currently, claims 1-18 are pending.

2. In the Final Rejection of 11 January 2008, claims 1, 2, 8, 9, 15, and 17 were rejected under 35 U.S.C. 102(e) as anticipated by US Patent 7,079,581 B2 (Noh et al.). Claims 5-7 and 12-14 were rejected under 35 U.S.C. 102(b) as anticipated by US Patent 6,160,846 A (Chiang et al.). Claims 3, 4, 10, 11, 16, and 18 were rejected under 35 U.S.C. 103(a) as obvious over Noh et al. The prior art rejections of claims 1-4 and 8-11 were maintained following the Appeal Conference, and the prior art rejections of claims 15-18 were withdrawn. No conclusion was reached regarding claims 5-7 and 12-14.

3. In view of the Pre-Appeal Brief Review request filed on 12 May 2008, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

### ***Response to Arguments***

4. Applicant's arguments, see Pre-Appeal Brief Review request of 12 May 2008 and Interview of 09 July 2008, with respect to the rejection(s) of claim(s) 15-18 under 35 U.S.C. 102(e) and 103(a) have been fully considered and are persuasive. Therefore,

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the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US Patent 5,650,860 A (Uz).

### ***Specification***

5. The disclosure is objected to because of the following informalities: in page 18: lines 15-16, the phrase "a computer-readable media" is self-contradictory, since the word "media" is plural for "medium", but the article "a" indicates the singular, and on page 24, the last sentence is cut off and incomplete. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 8-14 and 17-18 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The relevant portions of the USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (Official Gazette Notice of 22 November 2005), Annex IV, read as follows:

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 2583-84, 32 USPQ2d at 1035.

Claims that recited nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. See *O'Reilly*, 56 U.S. (15 How.) at 112-114. Moreover, it does not appear that a claim reciting a signal encoded with functional

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descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.

...a signal does not fall within one of the four statutory classes of Sec. 101.

...signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claims 8-14 and 17-18 are drawn to a "computer-readable medium" storing functional descriptive material. Normally, the claims would be statutory. However, the specification, at page 18: lines 23-26, defines the claimed computer system and medium as encompassing non-statutory subject matter such as "a communication channel" or "a computer network".

A signal embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the statutory classes of §101. Rather, a "signal" is a form of energy, in the absence of any physical structure or tangible material. See *In re Nuijten*, 84 USPQ2d 1495 (Fed. Cir. 2007, *en banc* denied 2008, *writ cert.* pending). Because the full scope of the claims as properly read in light of the disclosure encompasses non-statutory subject matter, the claims as a whole are non-statutory.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 2, 8, and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent 7,079,581 B2 (Noh et al). Noh et al. teaches a variable-bit-rate (VBR) video encoder that models complexity based on motion vectors or mean absolute difference of the encoded frames. Regarding claim 1, Noh et al. teaches calculating quantization factor Q of present frame t using deviation parameter D, which is based on the ratio of current bit rate to target bit rate (column 8: lines 4-53). Deviation parameter D determines the variation of quantization adjustment parameter K, which in turn allows for variation in the quantization factor (column 8: lines 48-60). This corresponds with the claimed "scaling relaxation value". The variation of the quantization factor, in turn, is driven at least to prevent buffer overflow and underflow (column 9: lines 1-7). Figure 8, lastly, shows that once the quantization factor and variation for a video object have been determined, the video object is encoded with the quantization factor (column 8: lines 54-58). This corresponds with the claimed "encoding digital video information".

Regarding claim 2, as mentioned previously, in Noh et al., a quantization factor is increased if the buffer usage level exceeds a predetermined amount (column 9: lines 1-7).

Regarding claims 9, Noh et al. discloses a software embodiment (column 13: lines 52-64).

10. Claims 5-7 and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,160,846 A (Chiang et al.). Chiang et al. teaches a system for encoding a video that selects a quantizing scale to maintain video quality. Regarding claim 5, figure 2 of Chiang et al. shows coding method 200, which constrains the quantizing scale to control the bit rate. In the initial model of determining bit rate for a macroblock, bit rate  $R$  is directly proportional to picture complexity  $X$  and inversely proportional to quantizer scale  $Q$  (column 10: lines 35-37). Then, bit rate  $R$  corresponds to the claimed “complexity measure”. In other words, for a high-complexity picture,  $R$  is large and  $Q$  is small, and for a low-complexity picture,  $R$  is small and  $Q$  is large. In addition, the quantizer scale  $Q$  is initially determined as “an average of the quantizer scales used to code the macroblocks in the previous picture” (column 10: lines 65-67). This corresponds with the claimed “running average complexity measure”, as bit rate  $R$  directly depends on quantizer scale  $Q$ . Finally, since  $Q$  is further modified to produce an optimal value to maintain a relatively constant image quality (column 11: lines 1-7), and since  $R$  itself also is maintained to be relatively constant to prevent buffer overflow and underflow (column 13: lines 42-65), this corresponds with the claimed preventing significant changing of complexity.

Regarding claim 6, bit rate depends on a buffer fullness measure (column 13: lines 42-65), and so must be constrained within a certain range to prevent buffer overflow and underflow.

Regarding claim 7, the quantizer scale is used to produce a quadratic or polynomial regression model of the complexity model of the picture, corresponding to the claimed "non-linear smoothing filter".

Regarding claims 12-14, Chiang et al. discloses a software embodiment (claims 18-23).

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3, 4, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noh et al. Regarding claims 3, 4, and 10, and 11, Noh et al. calculates quantization factor  $Q(t)$  as  $(1 \pm K) \times Q(t-1)$ , where  $K$  is the product of a limitation parameter and a deviation parameter (column 8: lines 4-14). Then a scaling value is calculated by subtracting the scaling value and a scaling relaxation value from the scaling value.

Noh et al. discloses the claimed invention except the present invention adds a relaxation factor as an extra term to the calculation of a scaling factor. However, it would have been an obvious matter of design choice to add an extra term to the equation of Noh et al., since Applicant has not disclosed that the exact algorithm claimed for adjusting a scaling factor solves any stated problem or is for any particular



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purpose, and it appears that the invention would perform equally well using the algorithm of Noh et al.

13. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noh et al. in view of US Patent 5,650,860 A (Uz). Regarding claim 15, In Noh et al., R is the number of bits to be allocated in a frame, originally based on the bit rate of the previous frame (column 5: lines 39-40), corresponding with the claimed "initial value for a bit budget", and with quantization factor Q determined based on threshold values of buffer fullness (column 9: lines 1-7), corresponding to the "initial value for a scale value based on a percentage of a memory buffer space used" and parameter r as the deviation between the current bit rate and the target bit rate (column 8: lines 19-30). As previously mentioned in the rejection of claim 1, Deviation parameter D corresponds with the claimed "scaling relaxation control value" (column 8: lines 48-60) that updates scale value Q. However, Noh et al. does not disclose determining a "final bit budget".

Uz teaches an adaptive MPEG-2 rate control system using adaptive quantization. Regarding claim 15, in one embodiment of Uz, a two-pass encoding system is used. First, encoding is performed on a frame or macroblock using an initial bit budget BB, and then a deviation CE is determined based on the difference between the actual number of bits used and the bit budget (column 22: lines 32-39). The bit budget is then updated by adding a scaled version of deviation CE to the initial bit budget (column 22: lines 40-45), and the frame or macroblock is re-encoded in a second pass according to the updated bit budget (column 22: lines 46-63). Then, scaling constant  $\delta_b$  that

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determines how much an updated bit budget is allowed to deviate, corresponds with the claimed "relaxation control value", and the updated bit budget corresponds with the claimed "final bit budget". The second pass of encoding in Uz corresponds with the claimed step of encoding a video frame "using the final bit budget".

Noh et al. discloses the claimed invention except for encoding a frame based on an adjusted bit budget. Uz teaches that it was known to perform a two-pass encoding based on an updated bit budget. Therefore, it would have been obvious to one having ordinary skill in the art at the time the present invention was made to modify the coder of Noh et al. to perform two-pass coding, as taught by Uz, since Uz states in column 22: lines 28-36 that such a modification would provide feedback to ensure smooth bitrate transition in case of a sudden large deviation between an expected number of bits in a frame and actual number of bits.

Regarding claim 16, the quantization scale  $Q_t$  of Noh et al. is set within a range of minimum and maximum values according to the MPEG-4 standard (column 7: lines 40-61). Then the setting of the "scale value" as between 0 and 1 is merely a normalization of a range, as is well-known in the art. Additionally, regarding the range of the relaxation value, it can be easily deduced that the limitations of deviation parameter  $D$  shown in equation 9 of Noh et al. (column 8: lines 8-10) show that  $0 \leq D \leq 1$ , and Uz explicitly shows bit budget relaxation value  $\delta_b$  as 0.1, within the range of claim 16.

Regarding claims 17 and 18, Noh et al. discloses a software embodiment.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./  
Examiner, Art Unit 2621

/Mehrdad Dastouri/  
Supervisory Patent Examiner, Art Unit 2621